

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Robert J. Deri et al.

Docket No. : IL-10504

Serial No. :

Art Unit :

Filed :

Batch No. :

For : Wavelength-Conserving Grating  
Router For Intermediate Wavelength  
Density

Examiner :

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY  
STATUS [37 CFR 1.9 (f) and 1.27(d)] - NONPROFIT ORGANIZATION

I hereby declare that I am an official empowered to act on behalf of the nonprofit organization identified below:

The Regents of the University of California  
Office of General Counsel  
1111 Franklin Street  
Oakland, CA 94607-5200

TYPE OF ORGANIZATION

☒ University or other Institute of Higher Education

I hereby declare that the nonprofit organization identified above qualifies as a nonprofit organization as defined in 37 CFR 1.9(e) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code with regard to the invention entitled: Wavelength-Conserving Grating Router For Intermediate Wavelength Density

by inventor(s) Robert J. Deri, Rajesh R. Patel, Steven W. Bond, and Cory V. Bennett

described in

☒ the specification filed herewith.

\_\_\_\_\_ application serial no. \_\_\_\_\_, filed \_\_\_\_\_.

\_\_\_\_\_ patent no. \_\_\_\_\_, issued \_\_\_\_\_.

I hereby declare that rights under contract or law have been conveyed to and remain with the nonprofit organization with regard to the above identified invention, except for a license to a Federal Agency pursuant to 35 USC 202(c) (4).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

  X   no such person, concern, or organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true: and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

JANET G. TULK  
Laboratory Counsel  
Lawrence Livermore National Laboratory  
7000 East Avenue, L-701  
Livermore, CA 94551

Janet G. Tulk  
JANET G. TULK

6/7/00  
Date

# COMBINED DECLARATION AND POWER OF ATTORNEY

- ☒ Declaration submitted  
with Initial Filing  
☐ Declaration submitted  
after Initial Filing (surcharge  
(37 CFR 1.16(e)) required)

Attorney Docket: IL-10504  
Applicant: Robert J. Deri et al.  
Serial No.:  
Filing Date:

As a below named inventor(s), I (we) hereby declare that:

My (Our) residence, post office address and citizenship(s) are as stated below next to my (our) name(s).

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: Wavelength-Conserving Grating Router For Intermediate Wavelength Density

the specification of which (check one)

X is attached hereto \_\_\_\_\_ was filed on \_\_\_\_\_ as United States Application Number or PCT International Application Number \_\_\_\_\_ and was amended on \_\_\_\_\_ (if applicable).

I (We) hereby state that I (we) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I (We) acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I (We) hereby claim foreign priority benefits under 35, U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

Priority Not Claimed

\_\_\_\_\_  
(Application Number) (Country) (Foreign Filing Date)



\_\_\_\_\_  
(Application Number) (Country) (Foreign Filing Date)



I (We) hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below:

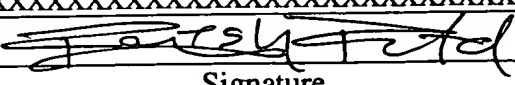
60/141899  
Application Serial No.

6/30/99  
Filing Date

I (We) hereby claim the benefit under 35 U.S.C. 120 of any United States applications(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

| Application Serial No.  | Filing Date      | Status                            |
|---|------------------|-----------------------------------|
| <b>POWER OF ATTORNEY:</b> As the named inventor(s), I (we) hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. |                  |                                   |
| Names   | Registration No. |                                   |
| Alan H. Thompson  | 29,981           |                                   |
| Christopher J. Horgan   | 40,394           |                                   |
| Eddie E. Scott  | 25,220           |                                   |
| <u>Direct Correspondence To:</u>  |                  | <u>Direct Telephone Calls To:</u> |
| L.E. Carnahan   |                  | (Name and Telephone Numbers)      |
| Patent Attorney   |                  | L.E. Carnahan                     |
| Lawrence Livermore National Laboratory  |                  | (925) 422-5024                    |
| P.O. Box 808 - L-703  |                  |                                   |
| Livermore, California 94551   |                  |                                   |

I (We) hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

|  |  |
|--|--|
| ROBERT J. DERI   | SEE PAGE 4   |
| Full Name of Inventor  | Signature  |
| PLEASANTON, CALIFORNIA   |  |
| Residence (City, State or Foreign Country)                           | Date   |
| 3769 ANGUS WAY, PLEASANTON, CALIFORNIA 94588                         | USA  |
| Postal Address (Street, City, State, Zip Code)                       | Citizenship  |
| XX |  |
| RAJESH R. PATEL  |  |
| Full Name of Inventor  | Signature  |
| PLEASANTON, CALIFORNIA   | 6/27/00  |
| Residence (City, State or Foreign Country)                           | Date   |
| 2503 SANTA RITA ROAD, #42, PLEASANTON, CALIFORNIA 94566              | USA  |
| Postal Address (Street, City, State, Zip Code)                       | Citizenship  |
| XX |  |



I (We) hereby claim the benefit under 35 U.S.C. 120 of any United States applications(s), or 365(e) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

| Application Serial No.  | Filing Date                  | Status |
|---|------------------------------|--------|
| <b>POWER OF ATTORNEY:</b> As the named inventor(s), I (we) hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith. |                              |        |
| Names   | Registration No.             |        |
| Alan H. Thompson  | 29,981                       |        |
| Christopher J. Horgan   | 40,394                       |        |
| Eddie E. Scott  | 25,220                       |        |
| Direct Correspondence To:   | Direct Telephone Calls To:   |        |
| L.E. Carnahan   | (Name and Telephone Numbers) |        |
| Patent Attorney   | L.E. Carnahan                |        |
| Lawrence Livermore National Laboratory  | (925) 422-5024               |        |
| P.O. Box 808 - L-703  |                              |        |
| Livermore, California 94551   |                              |        |

I (We) hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

|  |                       |
|--|-----------------------|
| ROBERT J. DERI   | <i>Robert J. Deri</i> |
| Full Name of Inventor  | Signature             |
| PLEASANTON, CALIFORNIA   | 6/27/00               |
| Residence (City, State or Foreign Country)                                   | Date                  |
| 3769 ANGUS WAY, PLEASANTON, CALIFORNIA 94588                                 | USA                   |
| Postal Address (Street, City, State, Zip Code)                               | Citizenship           |
| XX |                       |
| RAJESH R. PATEL  |                       |
| Full Name of Inventor  | Signature             |
| PLEASANTON, CALIFORNIA   |                       |
| Residence (City, State or Foreign Country)                                   | Date                  |
| 2503 SANTA RITA ROAD, #42, PLEASANTON, CALIFORNIA 94566                      | USA                   |
| Postal Address (Street, City, State, Zip Code)                               | Citizenship           |
| XX |                       |

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**PATENTS ONLY**

To the Honorable Commissioner of Patents and Trademarks: Please record the attached original documents or copy thereof.

1. Name of conveying party(ies):

2. Name and Address of receiving party(ies):

1. Inventor's Names:

Robert J. Deri

The Regents of the University of California  
1111 Franklin Street  
Oakland, CA 94612-3550

Attorney Docket No.: IL-10504

3. Nature of conveyance:



Assignment

Execution Date: 8/15/00

4. Application number(s) or patent number(s): IL-10504

If this document is being filed together with a new  
application, the execution date of the application is:

A. Patent Application No.(s)

B. Patent No.(s)

5. Name and address of party to whom correspondence  
concerning document should be mailed:6. Total Number of applications and patents involved:  
ONE

Name:

L.E. Camahan

7. Total fee

\$

40.00

Address:

Lawrence Livermore Nat. Laboratory  
Intellectual Property Law, L-703

Enclosed



Authorized charge deposit account

7000 East Avenue  
Livermore, CA 94550

8.

Deposit Account number:

12-0695

DO NOT USE THIS SPACE

## 9. Statement and Signature

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy  
is a true copy of the original document.

Kathy E. Raymond

Name of Person Signing

*Kathy E. Raymond*  
Signature

8/17/00

Date

Total number of pages comprising cover sheet

1

## PATENTS ONLY

To the Honorable Commissioner of Patents and Trademarks: Please record the attached original documents or copy thereof.

1. Name of conveying party(ies): 2. Name and Address of receiving party(ies):

## 1. Inventor's Names:

Rajesh R. Patel  
Steven W. Bond  
Cory V. BennettThe Regents of the University of California  
1111 Franklin Street  
Oakland, CA 94612-3550

Attorney Docket No.: IL-10504

## 3. Nature of conveyance:



Assignment

Execution Date: 6/27/00

## 4. Application number(s) or patent number(s): IL-10504

If this document is being filed together with a new  
application, the execution date of the application is:

A. Patent Application No.(s)

B. Patent No.(s)

5. Name and address of party to whom correspondence  
concerning document should be mailed:6. Total Number of applications and patents involved:  
ONE

Name: L.E. Carnahan

7. Total fee \$ 40.00

Address: Lawrence Livermore Nat. Laboratory  
Intellectual Property Law, L-703☐ Enclosed  
☐ Authorized charge deposit account7000 East Avenue  
Livermore, CA 945508. Deposit Account number:  
12-0695

DO NOT USE THIS SPACE

## 9. Statement and Signature

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy  
is a true copy of the original document.

Kathy E. Raymond

Name of Person Signing

Kathy E. Raymond

Signature

6/29/00

Date

Total number of pages comprising cover sheet

1



## ASSIGNMENT

LLNL Case No.: IL-10504

For good and valuable consideration the receipt of which is hereby acknowledged ASSIGNOR(s)

- |                           |                          |
|---------------------------|--------------------------|
| 1. <u>Rajesh R. Patel</u> | 2. <u>Steven W. Bond</u> |
| 3. <u>Cory V. Bennett</u> | 4. _____                 |
| 5. _____                  | 6. _____                 |
| 7. _____                  | 8. _____                 |
| 9. _____                  | 10. _____                |

hereby sells, assigns and transfers to ASSIGNEE, the Regents of the University of California, a California Corporation, having its statewide administrative offices located at 1111 Franklin Street, Oakland, California 94607-5200, and the successors, assigns and legal representative of the ASSIGNEE all of its right, title and interest for the United States and its territorial possessions and in all foreign countries in and to, any and all improvements which are disclosed in the invention entitled:

Wavelength-Conserving Grating Router For Intermediate Wavelength Density

and which is found in

- ☒ U.S. patent application executed on 6/27/00, entitled as above and listing the above named persons as inventors
- ☐ U.S. patent application serial no. \_\_\_\_\_, filed on \_\_\_\_\_
- ☐ U. S. patent no. \_\_\_\_\_, issued \_\_\_\_\_

and any legal equivalent thereof in a foreign country, including the right to claim priority and, in and to, all Letters Patent to be obtained for said invention by the above application or any continuation, division, continuation-in-part, extension or substitute thereof, and any reissue, reexamination or extension of said Letters Patent and all rights under all International Conventions for the Protection of Industrial Property;

ASSIGNOR(S) hereby covenants that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment;

ASSIGNOR(S) further covenants that ASSIGNEE will, upon its request, be provided promptly with all pertinent facts and documents relating to said invention and said Letters Patent and legal equivalents as may be known and accessible to ASSIGNOR and will testify as to the same in any interference, litigation, or proceeding relating thereto and will promptly execute and deliver to ASSIGNEE or its legal representative any and all papers, instruments or affidavits required to apply for, obtain, maintain, issue or enforce said application, said invention and said Letters Patent and said equivalents thereof which may be necessary or desirable to carry out the purposes thereof. An attorney of record is authorized and requested by the execution of this assignment to insert into this assignment the filing date and serial number of said application when officially known.

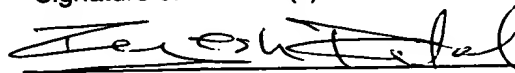
AND the ASSIGNOR(S) requests the Commissioner of Patents and Trademarks to issue said Letters Patent of the United States and any reissue or extension thereof to the ASSIGNEE, the Regents of the University of California.

executed this

6/27/00

Date

Signature of Inventor(s)



Rajesh R. Patel

executed this

6/27/00

Date

6/27/00

Date

Date

Date

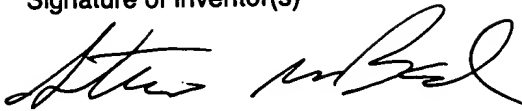
Date

Date

Date

Date

Signature of Inventor(s)



Steven W. Bond



Cory V. Bennett

### ASSIGNMENT

LNL Case No.: IL-10504

For good and valuable consideration the receipt of which is hereby acknowledged ASSIGNOR(s)

1. Robert J. Deri
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_

hereby sells, assigns and transfers to ASSIGNEE, the Regents of the University of California, a California Corporation, having its statewide administrative offices located at 1111 Franklin Street, Oakland, California 94607-5200, and the successors, assigns and legal representative of the ASSIGNEE all of its right, title and interest for the United States and its territorial possessions and in all foreign countries in and to, any and all improvements which are disclosed in the invention entitled:

Wavelength-Conserving Grating Router For Intermediate Wavelength Density

and which is found in

- ☒ U.S. patent application executed on 8/15/00, entitled as above and listing the above named persons as inventors
- ☐ U.S. patent application serial no. \_\_\_\_\_, filed on \_\_\_\_\_
- ☐ U.S. patent no. \_\_\_\_\_, issued \_\_\_\_\_

and any legal equivalent thereof in a foreign country, including the right to claim priority and, in and to, all Letters Patent to be obtained for said invention by the above application or any continuation, division, continuation-in-part, extension or substitute thereof, and any reissue, reexamination or extension of said Letters Patent and all rights under all International Conventions for the Protection of Industrial Property;

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AND the ASSIGNOR(S) requests the Commissioner of Patents and Trademarks to issue said Letters Patent of the United States and any reissue or extension thereof to the ASSIGNEE, the Regents of the University of California.

executed this

8/15/00  
Date

Signature of Inventor(s)

Robert J. Deri  
Robert J. Deri

**ASSIGNMENT**LLNL Case No.: IL-10504

For good and valuable consideration the receipt of which is hereby acknowledged ASSIGNOR(s)

- |                          |           |
|--------------------------|-----------|
| 1. <u>Robert J. Deri</u> | 2. _____  |
| 3. _____                 | 4. _____  |
| 5. _____                 | 6. _____  |
| 7. _____                 | 8. _____  |
| 9. _____                 | 10. _____ |

hereby sells, assigns and transfers to ASSIGNEE, the Regents of the University of California, a California Corporation, having its statewide administrative offices located at 1111 Franklin Street, Oakland, California 94607-5200, and the successors, assigns and legal representative of the ASSIGNEE all of its right, title and interest for the United States and its territorial possessions and in all foreign countries in and to, any and all improvements which are disclosed in the invention entitled:

Wavelength-Conserving Grating Router For Intermediate Wavelength Density

and which is found in

- ☒ U.S. patent application executed on \_\_\_\_\_, entitled as above and listing the above named persons as inventors
- ☐ U.S. patent application serial no. \_\_\_\_\_, filed on \_\_\_\_\_
- ☐ U.S. patent no. \_\_\_\_\_, issued \_\_\_\_\_

and any legal equivalent thereof in a foreign country, including the right to claim priority and, in and to, all Letters Patent to be obtained for said invention by the above application or any continuation, division, continuation-in-part, extension or substitute thereof, and any reissue, reexamination or extension of said Letters Patent and all rights under all International Conventions for the Protection of Industrial Property;

ASSIGNOR(S) hereby covenants that no assignment, sale, agreement or encumbrance has been or will be made or entered into which would conflict with this assignment;

ASSIGNOR(S) further covenants that ASSIGNEE will, upon its request, be provided promptly with all pertinent facts and documents relating to said invention and said Letters Patent and legal equivalents as may be known and accessible to ASSIGNOR and will testify as to the same in any interference, litigation, or proceeding relating thereto and will promptly execute and deliver to ASSIGNEE or its legal representative any and all papers, instruments or affidavits required to apply for, obtain, maintain, issue or enforce said application, said invention and said Letters Patent and said equivalents thereof which may be necessary or desirable to carry out the purposes thereof. An attorney of record is authorized and requested by the execution of this assignment to insert into this assignment the filing date and serial number of said application when officially known.

AND the ASSIGNOR(S) requests the Commissioner of Patents and Trademarks to issue said Letters Patent of the United States and any reissue or extension thereof to the ASSIGNEE, the Regents of the University of California.

executed this

8/15/00  
Date

Signature of Inventor(s)

Robert J. Deri  
Robert J. Deri

## RECORD OF INVENTION

Page 4

LLNL File No.

### IX. Inventor Information

Inventor's Permanent Home Address (Please attach a separate sheet for additional inventors.)

| Full Name        | Citizenship | Street Address           | City, State, Zip Code  |
|------------------|-------------|--------------------------|------------------------|
| Robert J. Deri   | USA         | 3769 Angus Way           | Pleasanton, CA 94588   |
| Rajesh R. Patel  | USA         | 2503 Santa Rita Road #42 | Pleasanton, CA 94566   |
| Steven W. Bond   | USA         | 1945 Whitecliff Court    | Walnut Creek, CA 94596 |
| Corey V. Bennett | USA         | 583 Debra Street         | Livermore, CA 94550    |
|                  |             |                          |                        |
|                  |             |                          |                        |
|                  |             |                          |                        |

### X. Funding Source

Funding Source or Project Under Which the Invention Arose (Include subcontracts, CRADAs, international agreements, work for others, or special project information.):

|                  |                   |   |  |     |     |    |
|------------------|-------------------|---|--|-----|-----|----|
| Resource Manager |                   | Phone #   | Is funding presently being provided for development of your invention? |     | Yes | No |
| Pam Richmond     |                   | 424-4965  |  |     | X   |    |
| LLNL Acct #      | B&R #             | Please state the source of funds (if same as above, please so state):             |  |     |     |    |
| 8989-60          | YN010000          | Engineering ER-LDRD   |  |     |     |    |
| Subcontract #    | DOE Program Code  | Do you reasonably expect future funding from the current source or other sources? |  | Yes | No  |    |
|                  |                   |   |  | X   |     |    |
| CRADA #          | Work for Others # | If yes, what is that source?  |  |     |     |    |
|                  |                   | US Government, possibly FY00 LDRD   |  |     |     |    |

### XI. Conception of the Invention

|  |                      |                                      |  |
|--|----------------------|--------------------------------------|--|
| Conception Date  | Conception Place     |                                      |  |
| 7/21/98  | B132S, Room 1771     |                                      |  |
| Earliest documentation of your invention (please provide date and identify the document): 7/21/98 Raj Patel's lab notebook |                      | First Sketch or Drawing Date 7/21/98 | First Written Description Date 7/21/98 |
| Names of Witnesses or others with knowledge of facts relating to conception (preferably at least 2):                       |                      |                                      |  |
| Full Name  | Organization         | Telephone Number                     |  |
| Mark Lowry   | B-Division Photonics | 423-2924                             |  |
| Mike Pocha   | Engineering EETD     | 422-8664                             |  |

### XII. Reduction To Practice of the Invention

|  |                               |                  |
|--|-------------------------------|------------------|
| Date first model completed   | Date of operation and testing | Place of test    |
| 2/22/99  | 2/23/99                       | B132S, Rm 1719   |
| Results of testing: demonstrated three wavelength router operating with channels at 820, 865, and 900 nm using single strands of multimode fiber. Used wavelength filters (IL-10266) for output combining. Insertion loss approx. 10 dB. |                               |                  |
| Demonstrated a 3-wavelength, 3x3 router based on a diffraction grating in Littrow configuration and 3 port filters. Results showed wavelength-conservative routing. See attached Fig. 3.   |                               |                  |
| Witnesses or others with direct knowledge of test (preferably at least 2):   |                               |                  |
| Full Name  | Organization                  | Telephone Number |
| Mark E. Lowry  | B-Division Photonics          | 423-2924         |
| Henry Garrett  | Engineering/EETD              | 422-5639         |
|  |                               |                  |

LLNL File No.

**XIII. Invention Use and Disclosure**

|   |     |    |  |
|---|-----|----|--|
| Has the invention been put into use?                              | Yes | No | If yes, explain:                                       |
|   |     | X  |  |
| Has the invention been disclosed to non-LLNL personnel?           | Yes | No | If yes, to whom and when? Provide name(s) and date(s): |
|   |     | X  |  |
| If yes, was the disclosure done under a non-disclosure agreement? | Yes | No |  |
|   | N   | A  |  |

**XIV. I/We believe myself/ourselves to be the first and original inventor(s) of the above-described invention.**

| Inventor Signature   | Date    | Witness Signature        | Date    |
|----------------------|---------|--------------------------|---------|
| <i>Robert John</i>   | 2/9/99  | <i>Dene Anderson</i>     | 3/9/99  |
| <i>Tamara Sted</i>   | 3/10/99 | <i>Theodore J. Saito</i> | 3/10/99 |
| <i>Robert Sted</i>   | 3/10/99 | <i>Bryan J. Charles</i>  | 3/10/99 |
| <i>Corey Bennett</i> | 3/10/99 | <i>Phillip Lee Hight</i> | 3/10/99 |
|                      |         |                          |         |
|                      |         |                          |         |

**XV. Classification Review**

|  |                             |                                  |                |
|--|-----------------------------|----------------------------------|----------------|
| Basis for unclassified release:                    |                             |                                  |                |
| <input checked="" type="checkbox"/>                | Outside scope of AEA and EO |                                  |                |
|  | CG-DAR-1, Topic(s):         |                                  |                |
|  | Other Guide(s):             |                                  |                |
|  | Topic(s):                   |                                  |                |
| UCNI   | Yes                         | No                               | If YES, Guide: |
|  |                             | X                                |                |
| Authorized Derivative Classifier -- Name and Title |                             | Signature                        |                |
| Steve Swierkowski -- Engineer                      |                             | <i>Steve Swierkowski</i> 3/10/99 |                |
| Confirming Reviewer -- Name                        |                             | Signature                        |                |
|  |                             | <i>See next page</i>             |                |

**XVI. For LLNL Patent Group Use Only**

|  |      |
|--|------|
| Possible Statutory Bars                                |      |
| Publication  |      |
| Public Use/Sale  |      |
| Recommended Filing Date Due to Possible Statutory Bars |      |
| Preliminary Review By:                                 | Date |
|  |      |

Send the completed and signed form to the Patent Group at L-703

**RECORD OF INVENTION**

Page 5

LLNL File No.

**XIII. Invention Use and Disclosure**

|   |     |                                     |  |
|---|-----|-------------------------------------|--|
| Has the invention been put into use?                              | Yes | No                                  | If yes, explain:                                       |
|   |     | <input checked="" type="checkbox"/> |  |
| Has the invention been disclosed to non-LLNL personnel?           | Yes | No                                  | If yes, to whom and when? Provide name(s) and date(s): |
|   |     | <input checked="" type="checkbox"/> |  |
| If yes, was the disclosure done under a non-disclosure agreement? | Yes | No                                  |  |
|   | N   | A                                   |  |

**XIV. I/We believe myself/ourselves to be the first and original inventor(s) of the above-described invention.**

| Inventor Signature      | Date    | Witness Signature        | Date    |
|-------------------------|---------|--------------------------|---------|
| <i>Robert John</i>      | 2/9/99  | <i>Irene Anderson</i>    | 3/9/99  |
| <i>Timothy J. Fitch</i> | 3/10/99 | <i>Theodore J. Saito</i> | 3/10/99 |
| <i>Robert J. Fitch</i>  | 3/10/99 | <i>Bryan J. Chapple</i>  | 3/10/99 |
| <i>Corey Bennett</i>    | 3/10/99 | <i>Phillip Lee Hight</i> | 3/10/99 |
|                         |         |                          |         |
|                         |         |                          |         |

**XV. Classification Review**

|  |                             |                                     |                |
|--|-----------------------------|-------------------------------------|----------------|
| Basis for unclassified release:                    |                             |                                     |                |
| <input checked="" type="checkbox"/>                | Outside scope of AEA and EO |                                     |                |
| <input type="checkbox"/>                           | CG-DAR-1, Topic(s):         |                                     |                |
| <input type="checkbox"/>                           | Other Guide(s):             |                                     |                |
| Topic(s):  |                             |                                     |                |
| UCNI   | Yes                         | No                                  | If YES, Guide: |
|  |                             | <input checked="" type="checkbox"/> |                |
| Authorized Derivative Classifier -- Name and Title |                             | Signature                           |                |
| Steve Swierkowski -- Engineer                      |                             | <i>Steve Swierkowski</i> 3/10/99    |                |
| Confirming Reviewer -- Name                        |                             | Signature                           |                |
| Wm. A. Bollinger Classification Advisor            |                             | <i>Wm. A. Bollinger</i>             |                |

**XVI. For LLNL Patent Group Use Only**

|  |      |
|--|------|
| Possible Statutory Bars                                |      |
| Publication  |      |
| Public Use/Sale  |      |
| Recommended Filing Date Due to Possible Statutory Bars |      |
| Preliminary Review By:                                 | Date |
|  |      |

Send the completed and signed form to the Patent Group at L-703